

Appl. No. 10/090,249
Reply to Office Action of December 6, 2005

Attorney Docket No. 28947.5
Customer No. 27683

REMARKS

Claims 11 and 12 have been amended, and Claim 21 has been added. Claims 1-14 and 16-21 are pending in the application. Applicants have previously paid filing fees in an amount sufficient to cover all of the claims that are now pending, and thus no additional filing fee is due in association with the submission of this Amendment. In view of the remarks that follow, Applicants respectfully request reconsideration.

Allowable Subject Matter

Noted with appreciation is the indication in the Office Action that Claim 13 is directed to allowable subject matter, and would be allowed if rewritten in independent form. Claim 13 depends from Claim 12, and Claim 12 is believed to be allowable for reasons discussed later. Accordingly, it is believed to be unnecessary to separately place Claim 13 in independent form at this time.

Independent Claim 1

Independent Claim 1 stands rejected under 35 U.S.C. §103 on the ground that it would be obvious in view of a proposed combination of teachings from Jones U.S. Patent No. 6,611,551 and Chen U.S. Patent No. 6,559,994. This ground of rejection is respectfully traversed. In this regard, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

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Applicants respectfully submit that Jones and Chen fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for mutually exclusive reasons that are discussed below.

THE PROPOSED COMBINATION DOESN'T TEACH THE CLAIMED SUBJECT MATTER

Jones and Chen, even when combined, do not teach the subject matter of Claim 1. In this regard, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

In the present application, Claim 1 includes a recitation of:

preparing the input signal to be less susceptible to errors caused by atmospheric variances during transmission through the atmosphere by performing an inverse fast Fourier transform on the two or more portions to create an orthogonal representation of the input signal, and

modulating at least one laser diode, using the orthogonal representation, such that modulated data can be transmitted on an atmospheric optical carrier between the first station and the second station. (Emphasis added).

The Office Action admits at lines 1-4 on page 3 that Jones does not disclose transmission of data on an atmospheric optical carrier. The Office Action therefore turns to the Chen patent, and

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notes that Chen discloses optical transmission of information in an orthogonal representation. The Office Action then asserts that, in view of Chen, it would be obvious to modify Jones to use an atmospheric optical carrier. This assertion is respectfully traversed. Chen discloses a system in which information in an orthogonal representation is transmitted optically through an optical fiber, rather than on an atmospheric optical carrier. For example, Chen explains in lines 16-17 of column 1 that the specific problem he is addressing is severe degradation of signal transmission quality within an optical fiber, due to chromatic dispersion within the optical fiber. Chen goes on to state that his invention provides an optical fiber transmitter for long-distance SCM systems (in lines 14-15 of column 3). Chen does not disclose a system that involves atmospheric optical transmissions, because atmospheric optical transmissions do not involve a chromatic dispersion problem comparable to that encountered within optical fibers. Thus, neither Jones nor Chen discloses transmission of information using an atmospheric optical carrier. Consequently, Jones and Chen do not together teach all of the limitations of Claim 1. Jones and Chen thus do not satisfy the requirement of MPEP §2142 that, to establish a *prima facie* case of obviousness, the prior art references when combined must teach or suggest all the claim limitations. Therefore, for this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by Jones and Chen, and notice to that effect is respectfully requested.

THERE IS NO MOTIVATION TO MAKE THE PROPOSED COMBINATION

Transmission of data in an orthogonal representation is known for certain applications. One technique for placing data into an orthogonal representation is orthogonal frequency domain modulation (OFDM). However, as recognized in paragraph [0006] of the present application as filed (paragraph [0007] as published), OFDM is computationally intensive. Consequently, it is normally used only in certain situations.

For example, where data is transmitted in the form of microwave signals, there can be serious "multipath" problems due to reflections, and it is known that OFDM is very beneficial in reducing errors due to multipath signals. Therefore, in applications involving microwave

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transmissions, it is very common to put data into an orthogonal representation by using a technique such as OFDM, because the benefits outweigh the cost and computational overhead. Jones notes in lines 46-48 of column 1 that use of OFDM can be beneficial in reducing multipath problems (for example in a microwave system).

Separate from microwaves, a different application for orthogonal representation involves optical fibers. In particular, where optical signals at different frequencies are transmitted through an optical fiber, the chromatic dispersion characteristics of the material of the fiber can cause problems, especially over long distances. For example, the chromatic dispersion characteristics can cause signals at different frequencies to travel at different speeds through the fiber, such that two or more signals transmitted simultaneously from a transmitter will not arrive simultaneously at a remote receiver. It is known that errors caused by the dispersion characteristics of the material of the fiber can be reduced by transmitting data in an orthogonal representation. Therefore, in applications involving transmission of optical signals through an optical fiber, it is known to put data in an orthogonal representation by using a technique such as OFDM, because the benefits outweigh the cost and computational overhead. Chen is an example of a system that uses OFDM in association with optical signals that are transmitted through an optical fiber.

MPEP §2142 specifies that:

To establish a *prima facie* case of obviousness . . . there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. . . . The teaching or suggestion to make the claimed combination . . . must both be found in the prior art, and not based on applicant's disclosure.

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Applicants' Claim 1 relates to transmission of information "through the atmosphere . . . on an atmospheric optical carrier". Optical transmissions through the atmosphere involve line-of-sight optical signals that are not subject to significant multipath problems. Moreover, while the material of an optical fiber has chromatic dispersion characteristics that can present significant problems for multiple optical signals at respective different frequencies, the atmosphere does not have dispersion characteristics that would present comparable problems of any significance. Consequently, the specific types of problems that have previously been addressed using orthogonal representation of data are simply not present in situations that involve transmission of optical signals through the atmosphere. Therefore, while Jones might motivate persons skilled in the art to use orthogonal representation for situations involving multipath problems, and while Chen might motivate persons skilled in the art to use orthogonal representation for signals transmitted through optical fibers, neither Jones nor Chen contains anything that would motivate a person skilled in the art to consider incurring the cost and computational overhead of using orthogonal representation for transmission of information "through the atmosphere . . . on an atmospheric optical carrier", as recited in Applicants' Claim 1. The only apparent motivation for using orthogonal representation for optical signals transmitted through the atmosphere is hindsight of the teachings of Applicants' disclosure. But the use of hindsight is strictly prohibited by the provisions of MPEP §2142. Consequently, the present §103 rejection based on Jones and Chen does not properly establish any motivation for making the proposed combination, which in turn means that the Office Action fails to properly establish a prima facie case of obviousness with respect to Claim 1. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 1 is not rendered obvious under §103 by Jones and Chen.

In view of the various different reasons discussed above, it is respectfully submitted that the present Office Action fails to establish a prima facie case of obviousness with respect to Claim 1, and that Claim 1 is therefore not rendered obvious under §103 by Jones and Chen. Claim 1 is thus believed to be allowable, and notice to that effect is respectfully requested.

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Independent Claim 14

Independent Claim 14 stands rejected under 35 U.S.C. §103 on the ground that it would be obvious in view of a proposed combination of teachings from Jones U.S. Patent No. 6,611,551 and Chow U.S. Patent No. 6,249,543. This ground of rejection is respectfully traversed. As noted above, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Jones and Chow fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 14, for mutually exclusive reasons that are discussed below.

THE PROPOSED COMBINATION DOESN'T TEACH THE CLAIMED SUBJECT MATTER

Jones and Chow, even when combined, do not teach the subject matter of Claim 14. In this regard, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

In the present application, Claim 14 includes a recitation of:

receiving an optical input signal containing the data from
an atmospheric optical carrier . . ., and

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multiplexing the two or more portions to extract the data,
wherein the multiplexing includes extracting a channel quality
estimate that accounts for atmospheric variances affecting the
atmospheric optical carrier. (Emphasis added).

In the sentence bridging pages 5-6, the Office Action asserts that Jones discloses transmission of data on "an atmospheric optical carrier". However, this assertion is directly contrary to the admission in the Office Action that Jones does not disclose transmission of data on an atmospheric optical carrier (lines 1-3 on page 3). There is no specific teaching in Jones of the use of an atmospheric optical carrier. In lines 44-53 of column 3, Jones makes vague and passing mention of a wireless transmission medium, but also indicates that a receiver antenna would be provided for such a wireless medium. Consequently, Jones was apparently contemplating wireless communications such as microwave signals or radio frequency signals that need a receiver antenna, and that are subject to the multipath problems for which orthogonal representation of data is known to be beneficial (as discussed earlier). As a practical matter, persons skilled in the art would not normally contemplate using orthogonal representation with an atmospheric optical carrier, and there is nothing in Jones suggesting that his mention of some "wireless" communications was intended to encompass atmospheric optical communications, as opposed to other types of wireless transmissions for which orthogonal representation is commonly used. The Office Action also relies on the Chow patent, but for teachings about forward error correction (FEC) techniques, rather than any teaching about use of atmospheric optical carriers. (The focus of Chow appears to be telephone systems that use wires or optical fibers). Accordingly, it is respectfully submitted that neither Jones nor Chow appears to disclose transmission of information using an atmospheric optical carrier. Consequently, even if Jones and Chow are considered together, they do not teach all of the limitations of Claim 14. Jones and Chow thus do not satisfy the requirement of MPEP §2142 that, to establish a *prima facie* case of obviousness, the prior art references when combined must teach or suggest all the claim

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limitations. Therefore, for this independent reason alone, it is respectfully submitted that Claim 14 is not rendered obvious under §103 by Jones and Chow, and notice to that effect is respectfully requested.

THERE IS NO MOTIVATION TO MAKE THE PROPOSED COMBINATION

As noted earlier, MPEP §2142 specifies that:

To establish a *prima facie* case of obviousness . . . there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. . . . The teaching or suggestion to make the claimed combination . . . must both be found in the prior art, and not based on applicant's disclosure.

As discussed in detail earlier in association with Claim 1, transmission of data in an orthogonal representation is known for certain specific situations, for example to reduce multipath problems in microwave systems, or to reduce problems caused by chromatic dispersion characteristics in the material of an optical fiber. Applicants' Claim 14 relates to transmission of information on "an atmospheric optical carrier", and optical transmissions through the atmosphere involve line-of-sight optical signals that are not subject to significant multipath problems or chromatic dispersion problems. Applicants respectfully submit that neither Jones nor Chow contains anything that would motivate a person skilled in the art to consider incurring the cost and computational overhead of using orthogonal representation for transmission of information on "an atmospheric optical carrier", as recited in Applicants' Claim 14. The only apparent motivation for using orthogonal representation for optical signals transmitted through the atmosphere is hindsight of the teachings of Applicants' disclosure. But the use of hindsight of

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Applicants' disclosure is strictly prohibited by the provisions of MPEP §2142. Consequently, the present §103 rejection based on Jones and Chow does not properly establish any motivation for making the proposed combination, which in turn means that the Office Action fails to properly establish a prima facie case of obviousness with respect to Claim 14. Accordingly, for this independent reason alone, it is respectfully submitted that Claim 14 is not rendered obvious under §103 by Jones and Chow.

In view of the various different reasons discussed above, it is respectfully submitted that the present Office Action fails to establish a prima facie case of obviousness with respect to Claim 14, and that Claim 14 is therefore not rendered obvious under §103 by Jones and Chow. Claim 14 is thus believed to be allowable, and notice to that effect is respectfully requested.

Independent Claim 16

Independent Claim 16 stands rejected under 35 U.S.C. §103 on the ground that it would be obvious in view of a proposed combination of teachings from Jones and Chow. This ground of rejection is respectfully traversed. Claim 16 includes a recitation of:

receiving an optical input signal containing the data from
an atmospheric optical carrier. . . .

detecting errors in the two or more portions caused by
atmospheric variances affecting the atmospheric optical
carrier, (Emphasis added)

In regard to the use of an atmospheric optical carrier, the rationale given in the Office Action for the rejection of Claim 16 is similar to the rationale given for the rejection of Claim 14. Accordingly, for the same basic reasons discussed above in association with Claim 14, it is respectfully submitted that the present Office Action fails to establish a prima facie case of

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obviousness with respect to Claim 16, and that Claim 16 is therefore not rendered obvious under §103 by Jones and Chow. Claim 16 is thus believed to be allowable, and notice to that effect is respectfully requested.

Independent Claims 11 and 12

Independent Claims 11 and 12 stand rejected under 35 U.S.C. §103 on the ground that they would each be obvious in view of a proposed combination of teachings from Jones and Chen. These grounds of rejection are respectfully traversed. As noted earlier, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Jones and Chen fail to establish a *prima facie* case of obviousness under §103 with respect to either of Claims 11 and 12, for mutually exclusive reasons that are discussed below.

THE REJECTIONS FAIL TO COMPLY WITH PTO REQUIREMENTS

MPEP §706.02(j) explains that, in order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, an examiner must satisfy four specific requirements. In particular, MPEP §706.02(j) specifies that:

35 U.S.C. 103 authorizes a rejection where, to meet the claim, it is necessary to modify a single reference or to combine it with one or

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more other references. After indicating that the rejection is under 35 U.S.C. 103, the examiner should set forth in the Office action:

(A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,

(B) the difference or differences in the claim over the applied reference(s),

(C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and

(D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.

In the present situation, the §103 rejections of Claims 11 and 12 fail to satisfy any of these four requirements, for reasons that are discussed separately below for each of the four requirements.

First, the rejection fails to properly satisfy requirement (A). More specifically, the §103 rejection of Claims 11 and 12 appears in lines 7-12 on page 4 of the Office Action. This rejection mentions some teachings from Chen, and lists some drawing reference characters and some line and column numbers. However, this rejection does not even mention Jones, much less identify what teachings from Jones are considered relevant to Claims 11 and 12, still less identify where any relevant teachings could be found within Jones.

Further, the rejection fails to satisfy requirement (B). In particular, the explanation of the rejection at lines 7-12 on page 4 never mentions Jones, much less identify any specific difference between Jones and the subject matter of either of Claims 11 and 12.

Moreover, the rejection fails to satisfy requirement (C), because the explanation of the rejection never identifies any proposed modification to Jones that would be needed in order to

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arrive at the subject matter of either of Claims 11 and 12.

In addition, the rejection fails to satisfy requirement (D), because the explanation of the rejection never discusses why one of ordinary skill in the art would have been motivated to make any modification to Jones.

Applicants therefore respectfully submit that the §103 rejection of Claims 11 and 12 is completely defective, because it fails to satisfy any of the PTO's four specific requirements for a §103 rejection. As a result, Applicants are not able to clearly understand what the rationale for the rejection is supposed to be, and are not required to try to respond to the rejection on the merits. Stated differently, the Examiner has failed to meet any of the various different requirements needed to establish a *prima facie* case of obviousness under §103. Consequently, as discussed in MPEP §2142, "the applicant is under no obligation to submit evidence of nonobviousness". For this reason alone, it is respectfully submitted that the §103 rejection of Claims 11 and 12 must be withdrawn, and notice to that effect is respectfully requested.

THE PROPOSED COMBINATION DOESN'T TEACH THE CLAIMED SUBJECT MATTER

Jones and Chen, even when combined, do not teach the subject matter of Claim 11 or Claim 12. In this regard, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. (Emphasis added).

In the present application, Claim 11 includes a recitation of:

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modulating at least one laser diode, using the orthogonal representation, such that modulated data can be transmitted on an optical carrier between the first station and the second station, and distributing the modulated data across two or more optical carriers that are each transmitted by a respective said laser diode and that travel from the first station to the second station along respective different optical paths, wherein each optical carrier receives a predetermined portion of the modulated data.
(Emphasis added)

Similarly, Claim 12 includes a recitation of:

modulating at least one laser diode, using the orthogonal representation, such that modulated data can be transmitted on an optical carrier between the first station and the second station, and distributing the modulated data across two or more optical carriers that are each transmitted by a respective said laser diode and that travel from the first station to the second station along respective different optical paths, wherein an amount of modulated data to be carried by each carrier is dynamically allocated. (Emphasis added)

Jones and Chen each disclose systems in which all optical information is transmitted along a single common optical path. Claims 11 and 12 are different, in that each recites different optical signals traveling along respective different optical paths. Consequently, Jones and Chen do not

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together teach all of the limitations of Claim 11 or Claim 12. Jones and Chen thus do not satisfy the requirement of MPEP §2142 that, to establish a *prima facie* case of obviousness, the prior art references when combined must teach or suggest all the claim limitations. Therefore, for this independent reason alone, it is respectfully submitted that neither Claim 11 nor Claim 12 is rendered obvious under §103 by Jones and Chen, and notice to that effect is respectfully requested.

In view of the various different reasons discussed above, it is respectfully submitted that the present Office Action fails to establish a *prima facie* case of obviousness with respect to either Claim 11 or Claim 12, and that Claims 11 and 12 are therefore not rendered obvious under §103 by Jones and Chen. Claims 11 and 12 are thus believed to be allowable, and notice to that effect is respectfully requested.

Independent Claim 19

Independent Claim 19 stands rejected under 35 U.S.C. §103 on the ground that it would be obvious in view of a proposed combination of teachings from Jones and and Chow. This ground of rejection is respectfully traversed. As noted above, the PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Jones and Chow fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 19, for mutually exclusive reasons that are discussed below.

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THE PROPOSED COMBINATION DOESN'T TEACH THE CLAIMED SUBJECT MATTER

Jones and Chow, even when combined, do not teach the subject matter of Claim 19. In this regard, the provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest all the claim limitations. (Emphasis added).

In the present application, Claim 19 includes a recitation of:

A system for transmitting data using line-of-sight optical carriers, the system comprising: . . .

means for preparing the input signal for transmission through the atmosphere, . . .

means for modulating the at least first and second laser diodes, using the orthogonal representation, such that modulated data is transmitted using spatial diversity on the optical carriers between the first station and the second station, . . . (Emphasis added).

In regard to the use of an atmospheric optical carrier, the rationale given in the Office Action for the rejection of Claim 19 is similar to the rationale given for the rejection of Claim 14. Accordingly, for the same basic reasons discussed above in association with Claim 14, it is respectfully submitted that, even considered together, Jones and Chow fail to teach all limitations recited in Claim 19, including use of an atmospheric optical carrier.

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Also, as discussed in association with Claims 11 and 12, Jones and Chow each disclose systems in which all optical information is transmitted along a single common optical path. In contrast, Claim 19 recites that first and second laser diodes are used to transmit data with "spatial diversity on the optical carriers". Consequently, Jones and Chen do not together teach all of the limitations in Claim 19, including transmission of multiple optical carriers with spatial diversity.

Summarizing, Jones and Chow fail to teach all of the limitations in Claim 19, including those relating to use of atmospheric optical carriers, and those relating to transmission of optical carriers with spatial diversity. Jones and Chow thus do not satisfy the requirement of MPEP §2142 that, to establish a *prima facie* case of obviousness, the prior art references when combined must teach or suggest all the limitations of Claim 19. Therefore, for this independent reason alone, it is respectfully submitted that Claim 19 is not rendered obvious under §103 by Jones and Chow. Claim 19 is therefore believed to be allowable, and notice to that effect is respectfully requested.

Dependent Claims

Claims 2-10 and 18, Claim 21, Claim 17 and Claim 20 respectively depend from Claim 1, Claim 11, Claim 16 and Claim 19, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claims 1, 11, 16 and 19, respectively.

Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at (972)739-8647.

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Although Applicants believe that no fee is due in association with the filing of this Response, the Commissioner is hereby authorized to charge any additional fee required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone LLP.

Respectfully submitted,



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Enclosures: None

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